WHAT IS CLAIMED IS:

1. A servo system which is used to play back information recorded on a recording layer or reflecting layer or recording/playing back on/from a recording layer from an information medium which has the recording layer or reflecting layer covered with a transparent layer that can be accompany thickness irregularity or refractive index irregularity, comprising

a light sending system for focusing light of a wavelength λ from a light source onto a recording surface of said information medium, a detection optical system for detecting the light of the wavelength λ from said information medium, and a servo system for reducing an optical aberration amount of the light of the wavelength λ focused on the recording surface of said information medium by said light sending system,

wherein a residual deviation amount of the optical aberration is kept to not more than 0.07 λ rms as a result of operation of said servo system for reducing the optical aberration amount.

2. A servo system which is used to play back information recorded on a recording layer or reflecting layer or recording/playing back on/from a recording layer from an information medium which has the recording layer or reflecting layer covered with a transparent layer that can accompany thickness

irregularity or refractive index irregularity, comprising

a light sending system for focusing light of the wavelength λ from a light source onto a recording surface of said information medium, a detection optical system for detecting the light of the wavelength λ from said information medium, and a servo system for reducing an optical aberration amount of the light of the wavelength λ focused on the recording surface of said information medium by said light sending system,

wherein a residual deviation amount of the optical aberration is kept to not more than 0.07 λrms $\times$ G where G is a servo gain for said servo system for reducing the optical aberration amount as a result of operation of said servo system.

3. A method of measuring a thickness of a transparent layer, comprising the steps of:

irradiating a recording layer or reflecting layer of an information medium, covered by a transparent layer that can accompany thickness irregularity, with a focused light beam through the transparent layer;

measuring an aberration amount of light reflected by the recording layer or reflecting layer; and

obtaining a thickness of the transparent layer from the measured aberration amount.

4. An information medium which has a recording layer or reflecting layer protected by a transparent

layer which has a predetermined thickness d and can accompany irregularity of a refractive index n in a predetermined range and thickness irregularity in a predetermined range,

wherein a relationship between the refractive index n and thickness d of the transparent layer is defined in a range surrounded by six points:

(1) n = 1.42, d = 186 μm;

(2) n = 1.57, d = 160 μm;

(3) n = 1.72, d = 160 μm;

(4) n = 1.72, d = 40 μm;

(5) n = 1.57, d = 40 μm; and

(6) n = 1.42, d = 66 μm.

5. An information medium which has a recording layer or reflecting layer protected by a transparent layer which has a predetermined thickness d and can accompany irregularity of a refractive index n in a predetermined range and thickness irregularity in a predetermined range,

wherein when said information medium is to be used in an apparatus including an objective lens for guiding coherent light of a predetermined wavelength to the recording layer or reflecting layer through the transparent layer, and a thickness servo system for suppressing an influence of an optical aberration of the objective lens due to thickness irregularity or refractive index irregularity in the transparent layer,

thickness irregularity δd of the transparent layer is managed to become not more than a value corresponding to

$$\{[0.94 \times 8 \cdot n^3]/[0.07 \times (n^2 - 1) \times (NA)^4]\} \times (G \cdot Wcrms)$$

where n is a refractive index of the transparent layer, NA is a numerical aperture of the objective lens, G is a servo gain of the thickness servo system, and Wcrms is a correction function for the optical aberration due to servo operation of the thickness servo system.

6. An information medium wherein

said medium has a first recording layer or reflecting layer and a second recording layer or reflecting layer stacked on the first recording layer or reflecting layer through a transparent space layer, and a transparent layer which has a predetermined thickness d and can accompany irregularity of a refractive index n in a predetermined range and thickness irregularity in a predetermined range is formed on the first recording layer or reflecting layer,

the predetermined thickness d indicates a distance from a surface of the transparent layer to an intermediate portion of the space layer, and

a relationship between the refractive index n and thickness d of the transparent layer is defined in a range surrounded by six points:

(1) n = 1.42, d = 229 μm;

(2) n = 1.57, d = 190 μm;

(3) n = 1.72, d = 190 μm;

(4) n = 1.72, d = 10 μm;

(5) n = 1.57, d = 10 μm; and

(6) n = 1.42, d = 49 μm.

7. An apparatus which is used to play back information recorded on a recording layer or reflecting layer or recording/playing back on/from a recording layer from an information medium which has the recording layer or reflecting layer covered with a transparent layer that can accompany thickness irregularity or refractive index irregularity, comprising

a light sending system for focusing light from a light source onto a recording surface of said information medium, a detection optical system for detecting the light from said information medium, and aberration correction means for correcting an optical aberration of the light focused on the recording surface of said information medium by said light sending system,

wherein when information recorded on the recording layer or reflecting layer is played back, or information is recorded/played back on/from the recording layer, said aberration correction means corrects the optical aberration.

8. An apparatus which is used to play back

information recorded on an information medium or record/play back information on/from said information medium, comprising

a light sending system for focusing light from a light source onto the recording surface of said information medium, and a detection optical system for detecting light from said information medium,

wherein a spherical aberration state and defocusing state of the light focused on the recording surface of said information medium by said light sending system are independently detected.

9. An aberration state detection apparatus comprising:

a light sending system for focusing light from a light source onto a recording surface of an information medium;

a detection optical system for detecting light from said information medium; and

means for detecting a state of occurrence of wavefront aberration or spherical aberration of the light focused on the recording surface of said information medium by said light sending system from a detection result obtained by said detection optical system.

10. An apparatus comprising a light sending system for focusing light from a light source onto a recording surface of an information medium upon giving an optical

aberration to the light, and a detection optical system for detecting light from said information medium,

wherein an optical aberration state of the light focused on the recording surface of said information medium by said light sending system is detected from a detection result obtained by said detection optical system.

11. An apparatus for playing back information recorded along a track concentrically or spirally formed on an information medium by using a focused light beam, or recording information along a track concentrically or spirally formed on said information medium by using a focused light beam, comprising

a light source, an optical element having a light splitting function for focusing light from said light source onto a plurality of focusing positions on the recording surface of said information medium, a light sending system for focusing light from said optical element onto a plurality of focusing positions on the recording surface of said information medium, and a detection optical system for detecting the light from said information medium,

wherein a signal corresponding to a relative positional shift between the focused light beam and the track on the recording surface of said information medium is detected from said detection optical system.

12. An apparatus for playing back information

recorded along a track concentrically or spirally formed on an information medium by using a focused light beam, comprising

a light source, an optical element having a light splitting function for focusing light from said light source onto a plurality of focusing positions on the recording surface of said information medium, a light sending system for focusing light from said optical element onto a plurality of focusing positions on the recording surface of said information medium, and a detection optical system for detecting the light from said information medium,

wherein a signal corresponding to crosstalk between adjacent tracks on the recording surface of said information medium is detected from said detection optical system.